EggSperiments

There is more to an egg than meets the eye! This creative and educational activity explores the physics of eggs and the chemistry of osmosis while providing a fun sensory experience. How? By creating eggs that bounce! But eggs can't bounce, can they? They break when we drop them, don't they? In their natural state, they are very fragile, and yet they have a secret protective weapon inside.
Let's explore!

MATERIALS

Eggs
Spoon
Clear cups or jars
Distilled white vinegar
Bowl of water
Food coloring (optional)
Highlighter (optional)

From butterflies to dinosaurs, eggs have played a fascinating role in animal evolution. Before you begin the experiment, explore the concept of eggs with your children. What is an egg? What animals lay eggs? What happens inside an egg? What is the structure of an egg? How do babies emerge from eggs? Allow children to touch and explore both the outside and inside of an egg. Have them crack the egg to observe how strong the shell is, let them peel the membrane away from the shell, and encourage them to explore the texture of the plasma inside. Then discuss what they're touching! An egg is a protective "house" for new life. The hard shell protects the growing life inside, and feeds the embryo. The animal embryo develops until it can survive outside of the egg, at which point the egg hatches. The key parts of an egg consist of the shell, an inner and outer membrane, the egg white, and the yolk. The shell is mostly made up of calcium carbonate. Beneath it are two transparent membranes. They are held together tightly to keep bacteria from getting through, which protects the baby. The membrane is the part of the egg that sticks to the shell. Under the membrane is the egg white and yolk. The egg white is made up of water and proteins. The yolk contains protein, vitamins, and minerals. Both help the baby to grow.

STEPS

PART 1

1) Gently place a raw egg in each cup.
2) Pour vinegar in each cup, making sure to fully submerge the egg in the liquid.
3) Add a few ample drops of food coloring and gently stir.
4) Wait! Observe! Soak the eggs undisturbed for 3-5 days. During that time, take a close look at what is happening, and what changes are occurring.

PART 2

A) After 3-5 days, remove each egg from its cup and place it in a bowl of water.
B) Gently rub the shell- You will see that is has dissolved, leaving only a chalky residue, and you can rub the residue right off!
C) Make scientific guesses! How is the egg in your hand still intact? What is holding it together if the shell is gone? (Answer: The membrane!)

PART 3

Experiment with your egg's new physics!

Squeeze It! Gently squish and squeeze the egg in your hands and notice how rubbery it is! (Don't squeeze too hard thought- It's still raw inside.)

Bounce It! Carefully drop your rubber egg onto a surface- It will bounce like a ball!

Break It! Puncture the membrane with a needle or sharp point and notice how the egg white is colored after sitting in colored vinegar- This means the color penetrated both the eggshell and the membrane!

Illuminate It! Shine a flashlight onto the egg and see what happens. Can you see through it?

WHAT HAPPENED?

The Science of Rubber Eggs

Eggshells are made from calcium carbonate, and vinegar is an acid. Vinegar reacts with calcium carbonate when the two touch. The bubbles that form around the eggs over the 3-5 days are carbon dioxide bubbles. This chemical reaction eats away at the hard shell, and eventually the eggshell fully dissolves, leaving only the soft and flexible membrane. The membrane is soft but strong, which is why you can play with it and bounce it without it breaking. When the acid in the vinegar eats through the calcium shell, the membrane is left encasing the egg. The texture feels rubbery, hence, the rubber egg.

Take your EggSperiment one step further and make a GLOW IN THE DARK rubber egg!

To do this, you will need a yellow highlighter marker. Simply open it up, remove the ink tube in the center, and squeeze the ink into the water the same way you would with food coloring. You can also drop the ink tube directly into the water and let it sit for an hour, as the water absorbs the ink. (Use gloves, unless you want glowing fingers!)

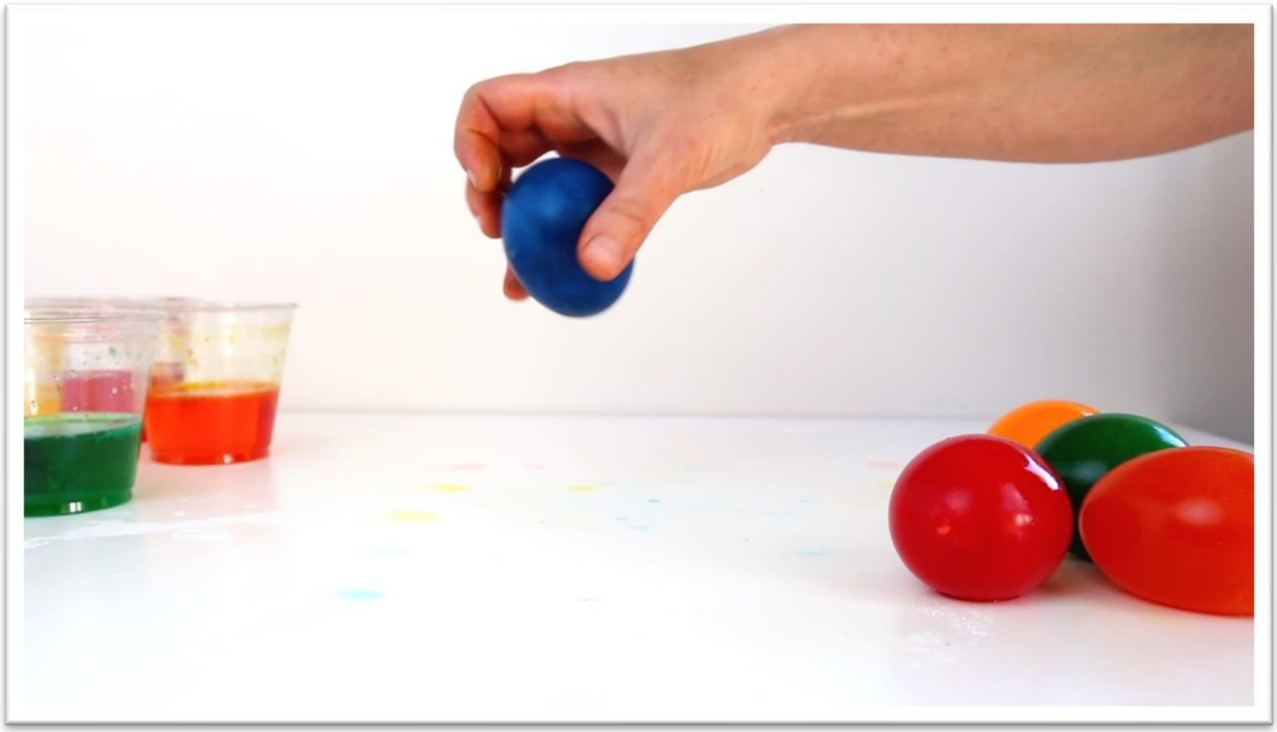
OPPORTUNITIES FOR EXPANDED LEARNING

Continue learning about eggs! Go for a nature walk and search for eggs. Not all will look like a standard chicken egg! Caterpillar eggs are tiny and can often be found in clusters on the underside of leaves. Hummingbird nests are about one inch in diameter, and their eggs about the size of a pinto bean! Spider eggs are usually found in small, white, silk sacs. How many types of eggs can you find? Where are they located? What time of year are they found? How are they different? How are they similar? Why do you think they are designed the way they are? What types of conclusions can you draw about the eggs you find based on what you learned from your rubber egg experiment?

EGGSPERIMENTS SUPPORT NGSS!

When doing rubber egg experiments, children will: Ask questions and define problems; Plan and carry out investigations; Analyze and interpret data; Construct explanations and design solutions; and Engage in argument from evidence. They will explore: Cause and effect; Energy and matter; Structure and function; and Stability and change, while learning about: Life Science, Earth and Space Science, and Physical Science.

HAVE FUN!



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